CHAPTER 4. ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

The CEQA Guidelines (Section 15126) require that the following sections be discussed regarding the environmental effects of the proposed project:

(a) Significant Environmental Effects of the Proposed Project.

(b) Significant Environmental Effects Which Cannot be Avoided if the Proposed Project is Implemented.

(c) Significant Irreversible Environmental Changes Which Would be Involved in the Proposed Project Should it be Implemented.

(d) Growth-Inducing Impact of the Proposed Project.

(e) The Mitigation Measures Proposed to Minimize the Significant Effects.

(f) Alternatives to the Proposed Project.

This Chapter discusses sections (a) Significant Environmental Effects of the Proposed Project, pursuant to the CEQA Guidelines, section 15126.2, and (e) The Mitigation Measures Proposed to Minimize the Significant Effects, pursuant to the CEQA Guidelines, Section 15126.4.

Section (f) Alternatives to the Proposed Project is discussed in Chapter 5: Analysis of Alternatives to the Proposed Project. Sections (b), Significant Environmental Effects Which Cannot be Avoided if the Proposed Project is Implemented, (c), Significant Irreversible Environmental Changes Which Would be Involved in the Proposed Project Should it be Implemented, and (d), Growth-Inducing Impact of the Proposed Project are discussed in Chapter 6: Other CEQA Considerations, along with Cumulative Impacts.

POTENTIALLY SIGNIFICANT IMPACTS TO BIOLOGICAL RESOURCES

During the initial study, the Department determined that the proposed project may have a potentially significant impact to biological resources. Because wild turkeys are not indigenous animals in the proposed project areas, the primary concern regarding potential impacts of the proposed project is to sensitive native biological resources. Such potential impacts may result from the direct effects of foraging activities and indirect effects that foraging activities may have to the environment. Wild turkeys are opportunistic omnivores, and they must utilize whatever food items are available to them in their new environment, some of which may include sensitive native species. Potential impacts may include predation of native species, competition with native species, and alteration or modification of their habitats, potentially jeopardizing their existence.

The following analyses are based on the information available in the scientific literature on wild turkey ecology, with an emphasis on food habits and foraging behavior, and information known about the sensitive resources potentially affected by the proposed project. Information regarding wild turkey ecology both within and outside their native range is quite extensive, including habitats similar to the proposed release sites. Research conducted within California is used in these analysis, in addition to any information that is specific to the project areas. Due to the relatively small areas that comprise the release sites, project specific information is understandably limited. However, the aggregate of wild turkey studies contains sufficient information upon which to analyze potential project impacts. The body of information regarding wild turkey food habits generally demonstrates consistent results, which can be extrapolated to likely wild turkey interactions with the environment at any location containing similar habitats.

Summaries of the information used in these analyses are presented in Chapter 3, which includes a discussion of wild turkey biology, and Appendix D, which provides a review of the wild turkey food habits literature that was used in this document. Statements made in this chapter regarding turkey behaviors and likely interactions with sensitive resources are based on the information presented in the aforementioned sections of this document.

The CEQA Guidelines (Section 15382) define a significant effect on the environment as a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. In this document, a significant impact is considered to be an impact that would result in a change in the abundance and/or distribution of any sensitive biological resources as the result of the proposed project.

Effects to Sensitive Plants

As discussed in Chapter 3, plants comprise the majority of the annual turkey diet, and turkeys released under the proposed project will consume plant items available to them within the release area. Wild turkeys have been documented to consume a wide variety of plants, and they may consume portions of many of the sensitive species potentially present in the project area. Potential impacts of wild turkeys to sensitive plants may result from herbivory and/or alteration of habitats through foraging activities.

Methods

Table 3.1 contains 183 sensitive plants potentially present within the composite release site analysis areas (25 mile radius surrounding each site), as described in

Chapter 3. Because not all of these plants were considered equally vulnerable to the proposed project, those plants with which turkeys are known to interact were selected as focal species for analysis of potential effects. Plants that have been documented as food items for wild turkeys were considered most vulnerable to the proposed project. Because the actual species may differ from those represented in the literature, all species in the same genus were considered to possess similar characteristics likely to be selected as a food item. Table 4.1 contains those plants potentially present in the project area that have been documented as wild turkey food items, with associated references. Statements regarding plant food habits in this chapter come from the information summarized in Table 4.1.

The literature was assembled into 3 categories for conducting these analyses. First, all information regarding turkey food habits in California was gathered, which involved 2 studies: 1) A study of Rio Grande hybrid turkeys in San Luis Obispo County in 1966 (Smith and Browning 1967), and 2) a study of Rio Grande hybrid turkeys in San Diego County in 1999 and 2000 (CDFG unpublished data; see Appendix D). Second, a comprehensive review of all studies conducted on the Merriam's subspecies was gathered, which is the subspecies intended for release. These birds also occupy habitats similar to the proposed release sites in their native range. Third, all information regarding food habits of the other subspecies was compiled.

When a particular plant genus was well represented as a food item in the California studies and/or the Merriam's turkey literature, only information for that genus was presented, assuming it was most relative to the proposed project. If a particular genus was not represented in the aforementioned studies, information available from the other subspecies is presented. Percent volume and percent occurrence in the sampled population are presented for each genus by study where available. Percent volume provides a measure of the importance of a particular food item to the wild turkey diet in each study, while percent occurrence provides a measure of the amount of

utilization of a particular food item within the sampled population. A review of the literature utilized in these analyses is contained in Appendix B.

All plants listed as threatened, endangered, or rare under CESA or FESA that were not already included in the analysis as known food items were also considered focal species for analysis of potential effects for two main reasons: 1) These plants are also protected under CESA and/or FESA, and 2) typically, more information was available regarding the population status and current threats to this group of plants to warrant listing under these acts.

The remaining plants were not considered focal species for analysis, but they were still considered potentially vulnerable to the proposed project. These plants may not have been documented as food items because they were not selected in a significant enough amount to have been detected in previous studies, or because they did not occur in areas where turkey food habits have been studied. Therefore, the following additional steps were taken to address potential impacts to those plants that are not either documented turkey food items or listed as threatened, endangered, or rare.

All of the sensitive species potentially present at the composite release sites were also placed into physiognomic categories, including: Grasses, annual herbs, perennial herbs, perennial herbs arising from bulbs, perennial herbs arising from woody underground structures, shrubs, and trees (Table 3.1). Because wild turkeys tend to consume portions of plants that provide nutritional value at different times of the year (i.e. mast in winter, herbaceous vegetation in spring), it is reasonable to assume that all species possessing similar physiognomy are likely to be interacted with similarly by wild turkeys. Because of these similarities, analysis of potential impacts to all species were conducted by physiognomic group, based on known information.

Two measures of each plant's current distribution and level of rarity were readily available in existing databases. The first source comes from the Department's list of Special Vascular Plants, Bryophytes, and Lichens, which comes from various government and non-government organizations, containing ranks of global and state rarity, which are included and explained in Table 3.1. The second source comes from the CalFlora database (CalFlora 2000), which also gathers its information from similar sources, and contains a rough geographical distribution by county of the known extant distribution of each of these species in California, which is summarized in Appendix D: Known Extant Distribution of Sensitive Flora. This data contains the number of known occurrences and their percent known extant distribution by county. Each release site is listed next to those counties that contain all or portions of the 25 mile project areas, to give a general idea of potential overlap of each plant's extant distribution in the state with the proposed project. However, because of the broad geographic resolution of this data, these percentages represent maximum extant distribution relative to the project area, and actual overlap may be smaller. For simplicity, the total percentage of each plant's distribution at the composite release sites is grouped in three categories: High = > 50%, Medium = 25 - 50%, Low = < 25%. In the few cases where CALFLORA does not contain% occurrence data, those Counties with possible occurrences are listed from the CNPS electronic inventory. Potential overlap for each release site by county is as follows:

Mendocino release site -- Mendocino, Glenn and Lake counties potentially impacted

Shasta release site -- Shasta County potentially impacted

Lassen release site -- Lassen County potentially impacted

Plumas release site -- Plumas County potentially impacted

Sierra release site – Sierra County potentially impacted

El Dorado release site – El Dorado County potentially impacted

The following analyses of potential impacts to plants are presented in sections by physiognomic type. Each section contains an opening discussion regarding common turkey interactions associated with each type, followed by analyses of potential effects to focal plants within types, assuming that given the opportunity, turkeys will consume particular portions of plants within types similarly. All conclusions regarding the effects of the proposed project to the environment are made at the end of the plant section.

Grasses

Grasses are the most widespread utilized group of plants in the turkey diet, and compose a significant amount of the turkey diet from spring through fall. Turkeys tend to consume grasses that are the most available to them, and they do not generally exhibit selectivity for particular species that are not abundant in the environment. However, given the opportunity, turkeys will utilize most grasses as food items.

While foraging, turkeys selectively eat portions of the individual grass plants, including freshly grown leaves and seeds that presumably provide the most nutritional value. When feeding within the herbaceous layer of vegetation, turkeys do not exhibit scratching behavior as much as when they are feeding directly on the ground for mast, and they do not generally damage plants by trampling. Turkeys generally move constantly while feeding on grasses and rarely spend long periods in any one area. They often continue to use the same areas to feed that are part of their daily movement patterns. Turkey flocks vary throughout the year, and generally reach their highest levels in fall and winter. However, during the time from hatching through 12 - 16 weeks of age, turkey poults feed primarily on insects. Because they are constantly moving, they are not highly efficient in removing all available food items, such as grass seeds, and they may even help facilitate local seed dispersal through foraging activities.

Agrostis hendersonii (Henderson's bent grass)

Agrostis hendersonii is potentially present in the Shasta project area and it has been historically recorded in the Plumas project area. This annual herb is on CNPS list 3, has a global and state ranking of G1, S1, with 13% of its distribution is in Shasta County (CalFlora 2000). *Agrostis* sp. has been documented in the turkey diet, accounting for 0.2% of the turkey diet in one study (Korschgen 1967). Due to its low distribution in the project area, turkeys are not likely to come in contact with this species.

Sphenopholis obtusa (prairie wedge grass)

Sphenopholis obtusa has historically recorded in El Dorado County, although it is not currently thought to exist there or in the vicinity of any of the other project areas (CalFlora 2000). This species is listed on CNPS list 2, but has no state or federal listing status. This grass is ranked S2.2 in California, but it is considered common outside California with a rank of G5.

S. obtusa was consumed during summer and accounted for 0.4% of the turkey diet in one study (Korschgen 1967), and it has not been reported as an important food item in the other turkey literature. Because this species is not currently thought to occur in any of the project areas, turkeys are unlikely to encounter it.

Orcuttia tenuis (slender Orcutt grass)

Orcuttia tenuis is listed by the state as endangered and by the federal government as threatened. Its known extant distribution includes 70 reported occurrences in Lake, Lassen, Plumas, Sacramento, Shasta, Siskiyou, and Tehama Counties (California Department of Fish and Game 2001c).

O. tenuis is an annual grass that occurs at the bottom of vernal pools in valley grasslands, blue oak woodlands, and lower montane coniferous forests, from about 100 - 5,700 feet in elevation. The decline of this species is associated with the loss of vernal pool habitats as a result of agricultural conversion (California Department of Fish and Game 2001c). Approximately half of the known occurrences of this species are found on private lands, and the Department, BLM, and USFS are protecting major populations in Tehama and Lassen counties with fencing exclusions. The USFS has monitored populations not fenced for grazing effects and reports them to be stable. Although *Orcuttia* sp. has not been reported in the turkey food habits literature, turkeys commonly consume grasses in the family Poaceae, and this species could be a potential turkey food item.

Pleuropogon hooverianus (North Coast semaphore grass)

Pleuropogon hooverianus is listed by the state as rare and has no federal status. Its known populations are restricted to a few sites in Mendocino, Sonoma, and Marin Counties, with 19% of its remaining distribution in Mendocino County, potentially within the project area. Most of the known historic sites are thought to be extinct, and the Sonoma and Mendocino sites are privately owned and subject to land conversion (California Department of Fish and Game 2001c).

P. hooverianus is a large perennial grass that grows in moist sites, including roadsides and clearings, near redwood forests and mixed evergreen forests and in the margins of vernal pools. Habitats dominated by redwood and large evergreen trees are peripheral and generally not occupied by wild turkeys, therefore it is unlikely wild turkeys will encounter the remaining populations of this species.

Tuctoria greenei (Greene's tuctoria)

Tuctoria greenei is a federal endangered species and a state rare species that may be found in the Shasta and Mendocino project areas. It is currently found in Butte, Merced, Shasta, and Tehama Counties, and it is believed to be extirpated from the San Joaquin Valley and south, with 5% of its remaining distribution in Shasta and Mendocino County (CalFlora 2000).

T. greenei is an annual grass that occurs in the dried bottoms of vernal pools in the Central Valley. Over half of its known occurrences have been extirpated by conversion to irrigated agriculture and intensive cattle grazing. This grass is particularly susceptible to livestock grazing because it germinates as vernal pools dry, while many other vernal pool plants have already become established by then (California Department of Fish and Game 2001c). Although *Tuctoria* sp. has not been documented as a food item for wild turkeys, they commonly consume grasses in the family Poaceae and *T. greenei* could be a potential food item.

Herbaceous Vegetation

Herbs are a widely utilized group of plants that may be consumed at any time of the year, but tend to be consumed when they are most abundant from spring through fall. Turkeys do not generally exhibit selectivity for particular species that are not widely available to them, but may consume any acceptable herbs if encountered. Generally, turkeys interact with most herbs similarly, although the herbs are broken into physiognomic categories in the following analyses because of the potential differences in their abilities to withstand potential disturbances of the proposed project, including turkey herbivory and foraging activities. As discussed earlier, in most cases the only available information regarding turkey food habits relative to a particular genus comes from knowledge about other species in the same genus. Therefore, potential impacts

to the entire genus are addressed with the same information, assuming that turkeys will interact with all species in the same genus similarly. However, the potential ramifications of the proposed project address each species and subspecies based on their current status and distributions. Some genera may contain species that fall into different physiognomic categories, such as both annual and perennial varieties of herbs. Because potential impacts to the entire genus are analyzed with the same information, in these cases the entire genus is addressed under the first section where they arise for consistency.

As with any plant, turkeys selectively eat parts of the individual plants that presumably provide adequate nutrition, including fresh vegetative growth and reproductive materials. Turkeys exhibit similar behavior while foraging on herbaceous vegetation as they do on grasses. Scratching behavior is not as prevalent while foraging in the herbaceous layer as while foraging on the ground for items such as mast. Turkeys also tend to keep moving while foraging on herbs, rarely spending long periods in any one location. Turkey flocks reach their highest point in late summer as hens come together with their broods, although they also consume insects at this time.

Annual Herbs

Amsinckia lunaris (bent flowered fiddleneck)

Amsinckia lunaris is a rare species that may be found in the Mendocino project area. It has a ranking of G2, S2.2, and 17% of its known range is in Lake County (CalFlora 2000). Another species in this genus, *Amsinckia intermedia* was consumed by turkeys in San Diego County (see Appendix D), accounting for 1.50% and 2.09% of the diet in 1999 and 2000, respectively. Turkeys may consume vegetative and reproductive parts of this plant if encountered.

Astragalus ssp. (Milk-vetch)

Two species of sensitive annual *Astragalus* spp. listed by the CNPS are potentially present in the project areas. *Astragalus geyeri* var. *geyeri* may be found in the area of the proposed Lassen release site. This subspecies is common outside California, with a ranking of G5T5, but less common in the state, with a ranking of S2.2, of which 66% is found in Lassen County (CalFlora 2000). *Astragalus rattanii* var. *jepsonianus* may be found in the area of the proposed Mendocino release site, with a ranking of G4T2, S2.2, and 42% of its California distribution in Glenn and Lake counties (CalFlora 2000).

Seven species and varieties of perennial *Astragalus* spp. listed by the CNPS are also potentially present in the project areas. *Astragalus agrestis* is a common plant outside California, ranked G5, S1.2, but very rare in state with 100% its California distribution in Lassen County. *Astragalus lemmonnii* is also more common outside California, ranked G3, S2.2, with 60% of its California distribution in Lassen, Plumas and Sierra counties (CalFlora 2000). *Astragalus lentiformis* is a rare plant throughout its range, ranked G2, S2.2, with 100% of its California distribution in Plumas Sierra county (CalFlora 2000). *Astragalus pulsiferae* var. *pulsiferae* is ranked G4T2, S1.2, with 94% of its distribution in Lassen, Plumas, and Sierra counties (CalFlora 2000). *Astragalus pulsiferae* var. *suksdorfii* is a more common subspecies, with a rank of G4T3, S3.2 and 85% of its statewide distribution in Lassen, Plumas, and Shasta counties (CalFlora 2000). *Astragalus webberi* is a very rare species, ranked G1, S1.2, and 95% of its remaining distribution in Plumas and Sierra counties (CalFlora 2000).

Astragalus sp. is very closely associated with the habitats occupied by Merriam's turkeys and it is a common food item. It was documented as a food item in most of the studies presented in Table 4.1 (Korschgen 1967, Scott and Boeker 1973). *Astragalus* sp. accounted for 1.53% and 1.08% of the turkey diet in San Diego County (see

Appendix D) in 1999 and 2000, respectively. In the other three studies, it ranged from 0.1% to 5.6% of the turkey diet, and was consumed by up to 64% of the turkey population. Turkeys may consume leaves and/or reproductive parts of this genus.

All of the proposed release sites except for El Dorado, have one or more species of *Astragalus* sp., and the remaining distribution of all nine of these varieties is high in the composite release sites. Because *Astragalus* sp. is consistently reported as a food item in the literature, wild turkeys are expected to consume any of these species if encountered. The potential effects of turkey herbivory may be presumably highest with the annual subspecies of *Astragalus* ssp. versus the perennial varieties, although the consequences of impacts to *Astragalus webberi* would also be high because it has such a limited distribution. Turkey herbivory may result in a low level incremental impact to these populations. Although a common food item, turkeys coexist with *Astragalus* sp. in their native range and they are not known to cause any impacts to this genus. *Astragalus sp.* is a low growing plant that is vulnerable to trampling, especially by livestock. However, turkeys are not known to impact plants through trampling, and they are considerably less of a concern than livestock.

Juncus leiospermus var. *leiospermus* (Juncus)

_____*Juncus leiospermus* var. *leiospermus* is a rare species with a rank of G2T2, S2.2, and 52% of its distribution in Shasta County. *Juncus spp.* was documented as a food item for turkeys in San Diego County (see Appendix D), accounting for 1.00% and 0.58% of the plant diet in 1999 and 2000, respectively. This plant is a low growing plant (2-12 cm), that may be susceptible to disturbance by foraging activities. Wild turkeys may consume vegetative and reproductive of this species if encountered.

Lotus rubriflorus (Lotus)

Lotus rubriflorus is a very rare species, ranked G1, S1.1. Historic occurrences of *L. rubriflorus* have been recorded in the Mendocino project area, although none are thought to currently exist there (CalFlora 2000). Its current range includes Colusa, Santa Clara, Stanislaus, and Tehama Counties (CalFlora 2000). Turkeys consumed *Lotus* spp. in San Diego County (see Appendix D), accounting for 0.06% and 0.18% of the diet in 1999 and 2000, respectively. Because this species is not considered present in any of the project areas, turkeys are not expected to interact with it.

Lupinus spp. (Lupine)

Two sensitive species of annual *Lupinus* spp. are potentially present in the project areas. *Lupinus milo-bakeri* is a state threatened species and it is also listed by the CNPS. This species is not common in California or elsewhere, with a rank of G1Q, S1.1, and 100% of its remaining distribution in Mendocino and Colusa counties (California Department of Fish and Game 2001c). This species is thought to occur primarily on private lands and roadsides (California Department of Fish and Game 2001c). *Lupinus pusillus* var. *intermontanus* is listed by the CNPS and it is considered more common than the former, with a ranking of G4T4, S2.2. Although historic occurrences of this species have been documented in the Lassen project area, none are thought to currently exist in the county (CalFlora 2000).

Two additional species of perennial *Lupinus* spp. listed by the CNPS are also potentially present in the project areas. *Lupinus antoninus* is a very rare species, with 61% of its known distribution in Mendocino and Lake counties (CalFlora 2000). *Lupinus dalesiae* is more common, with a rank of G3, S3.2 and 99% of its distribution in Sierra and Plumas counties (CalFlora 2000).

Lupinus sp. has been documented as a food item in Merriam's turkeys, but was consumed in relatively small amounts by 13% of the sampled population, accounting for <0.1% of the diet (Scott and Boeker 1973). This genus was also consumed in San Diego County (see Appendix D), accounting for 0.33% and 0.34% of the diet in 1999 and 2000, respectively. Turkeys coexist with *Lupinus* sp. in their native range and they are not known to cause any impacts to this genus. The potential effects of turkey herbivory may be presumably highest with the annual subspecies of *Lupinus* spp. versus the perennial varieties, although the consequences of potential impacts to *L. milo-bakeri*, *L. antoninus*, would be highest because of their limited distributions relative to the Mendocino project areas. Wild turkeys may consume vegetative and reproductive of this species if encountered.

Madia stebbinsii (Stebbin's madia)

Madia stebbinsii is listed by the CNPS and 5% of its remaining distribution is in Shasta County. *Madia* sp. was documented as a turkey food item in San Luis Obispo County, where it occurred in one of 14 samples in trace amounts (Smith and Browning 1967). Wild turkeys may consume vegetative and reproductive of this species if encountered.

Plagiobothrys lithocaryus (Mayacamas popcornflower)

Historic occurrences of *Plagiobothrys lithocaryus* have been recorded in Mendocino County, although this species is presumed extinct by the CNPS. This species occurred in small amounts in the turkey diet in San Luis Obispo County in 1966 (Smith and Browning 1967). Wild turkeys may consume vegetative and reproductive of this species if encountered.

Polygonum polygaloides ssp. *esotericum* (Modoc County Knotweed)

Polygonum polygaloides ssp. *esotericum* is listed by the CNPS, with a global ranking of G4G5T1, and a state ranking of S1.1. This subspecies may be found in the area of the proposed Sierra, Lassen, and Plumas release sites. *Polygonum* sp. has been documented as a turkey food item, accounting for 1.4% of the diet and occurring in 7.6% of the sampled population (Korschgen 1967). Wild turkeys may consume vegetative and reproductive of this species if encountered.

Trifolium amoenum (Showy Indian Clover)

Trifolium amoenum is a federal endangered species and is also listed by the CNPS. It is very rare endemic species to California, with a rank of G1, S1.1. Historic occurrences of this species have been documented in the Mendocino project area. Although it was thought to be extinct, it has recently been relocated.

Trifolium sp. is a common food item for wild turkeys, but generally accounts for a small amount of its diet, ranging from about 1% to 3% of its diet (Korschgen 1967, Laudenslager and Flake 1987, Smith and Browning 1967). In San Diego County (see Appendix D), turkeys consumed *Trifolium* sp., accounting for 1.68% and 1.69% of the diet in 1999 and 2000, respectively. Wild turkeys may consume vegetative and reproductive of this species if encountered.

Eriastrum brandegeae (Bradegee's Eriastrum)

Eriastrum brandegeae is listed by the state as rare and has no federal status. It is a very rare species, with a ranking of G1Q, S1.1, with 44% of its remaining populations in Glenn and Lake counties. Turkeys have not been documented to consume this species, which occurs in open, dry gravelly flats within closed-cone

forests, chaparral, and serpentine scrub (California Department of Fish and Game 2001c). These habitats are not preferred by wild turkeys and they are unlikely to come in contact with this species.

Gratiola heterosepala (Bogg's Lake hedge-hyssop)

Gratiola heterosepala is a state endangered species that may be found in the area of the proposed Lassen and Shasta release sites, with 26% of its remaining distribution in Lake, Lassen, and Shasta counties. This annual herb is semi-aquatic, and occurrences on the edge of inundated lands are probably only temporary habitat for this plant. Once thought to occupy only the Bogg's Lake area of Lake County, known occurrences have increased with recent surveys. Land disturbances, overgrazing, and exotic plant invasions are all identified as reasons for declines (California Department of Fish and Game 2001c). Turkeys are not known to consume *Gratiola* sp.

Howellia aquatillis (Water howellia)

Howellia aquatillis is a federal threatened species that may be found in the area of the proposed Mendocino release site, with all of its remaining distribution in or near the project area. This annual herb is an aquatic species that occupies fresh water marshes and swamps. Turkeys are not known to consume *Howellia* sp. and because it is an aquatic species, wild turkeys are unlikely to come in contact with it.

Limnanthes bakeri (Baker's meadowfoam)

Limnanthes bakeri is a state rare species that may be found in the area of the proposed Mendocino release site, with its entire remaining distribution found in Laytonville, Ukiah, and Little Lake Valley, Mendocino County. This annual herb is

largely an aquatic species that occupies seasonally saturated or inundated clay soils. The greatest threats to this species are drainage of soils for agriculture and development. Most occurrences of this species are in areas of grazing, and it appears to be tolerant of light disturbance from grazing (California Department of Fish and Game 2001c). Turkeys are not known to consume *Limnathes* sp.

Perennial Herbs

Carex spp. (Sedges)

Nine species of *Carex* spp. on CNPS list 2 are potentially present in the composite release site areas. All of these species are common outside California, with global ranks of G4 and G5, but less common in state as follows. *Carex comosa* is ranked S2?, with 48% of its distribution in Lake and Shasta counties. *Carex lasiocarpa* is ranked S1.3?, with 86% of its distribution in Lassen and Plumas counties. *Carex limosa* is ranked S3?, with 46% of its distribution in or near the El Dorado and Plumas counties. *Carex petasata* is ranked S1S2, with 30% of its distribution in Lassen County. *Carex sheldonii* is ranked S2.2, with a 56% of its distribution in Plumas County. *Carex vallicola* is ranked S2.3 with historic occurrences in Sierra County, although none are thought to currently exist there (CalFlora 2000).

Carex sp. is a common food item for turkeys throughout their range, however it is typically consumed in relatively small amounts (Korschgen 1967, Laudenslager and Flake 1987, Smith and Browning 1967). In the three studies listed in Table 4.1, including the San Luis Obispo County study, turkeys consumed trace amounts of *Carex* sp., although up to 23.3% of the population utilized it as a food item. In San Diego County (see Appendix D), *Carex* sp. accounted for 2.46% and 1.82% of the turkey diet in 1999 and 2000, respectively. Because *Carex* sp. is consistently reported as a food

item in the literature, wild turkeys are expected to consume any of these species if encountered.

Claytonia spp. (Claytonia)

Two species of *Claytonia* sp. on CNPS list 2 are potentially present in the project areas. *Claytonia megarhiza* is a common species outside California, but less common in state (G4?, S2S3). Although historic occurrences of this species have been recorded in the area of the El Dorado and Sierra release sites, none are thought to currently exist there (CalFlora 2000). *Claytonia umbellata* is also a common species outside California, but less common in state (G5?, S1.3), with 20% of its distribution in Lassen County.

Claytonia sp. was documented as a food item in a study of eastern turkeys. It accounted for 0.1 to 0.3% of the turkey diet (Korschgen 1967). This genus is not considered a preferred item for wild turkeys, but may be consumed incidentally if encountered.

Both of these species of *Claytonia* spp. are relative high altitude plants (California Department of Fish and Game 2000). *Claytonia megarhiza* is primarily an alpine plant, ranging from about 8,500 to 10,800, and occupies habitats unsuitable for turkeys. *C. umbellata* occupies subalpine coniferous forests from about 6,200 to 11,500 feet, which is peripheral habitat for turkeys.

Epilobium spp. (willowherb, fireweed)

Five species of *Epilobium* sp. listed by the CNPS are potentially present in the project areas. *Epilobium howellii* is a very rare species (G1, S1.3), with 33% of its known distribution in Sierra County. *Epilobium luteum* is common out of state, but more

rare in state (G5, S2?), with 60% of its known distribution in Plumas County. *Epilobium nivium* is less common (G2, S2.2), with 78% of its known distribution in Glenn, Lake, and Mendocino counties, and occurrences have also been recorded in Plumas and Lassen counties, although none are thought to currently exist there (CalFlora 2000). *Epilobium oreganum* is similarly rare (G2, S2.2), with 18% of its known distribution in El Dorado, Glenn, Mendocino, Plumas, and Shasta counties. *Epilobium palustre* is common out of state, but rare in state (G5, S1.3), with historic occurrences El Dorado County.

Epilobium sp. was documented as a turkey food item in San Diego County (see Appendix D), accounting for 0.16% and 0.14% of the diet in 1999 and 2000, respectively. It has not been reported in other literature. *Epilobium* sp. occupies a range of habitats from bogs and seeps to chaparral, both of which are peripheral for turkeys.

Erigeron spp. (daisies)

Historic occurrences of two species of *Erigeron* spp. listed by the CNPS are in the area of the Sierra release sites. *Erigeron miser* is a rare species, ranked G2 S2.3. Although historic occurrences of this species have been recorded in the area of the proposed Sierra release site, none are thought to currently exist there (CalFlora 2000). *Erigeron nevadincola* is more common out of state, but has a similar in state distribution, ranked G4, S2.3. The extant distribution of these species is unclear in the project area.

Erigeron sp. was documented as a food item in a study of Merriam's turkeys, accounting for up to 3.5% of the diet and utilized by up to 29% of the sampled population during summer (Scott and Boeker 1973). *Erigeron* sp. is a potential food item for turkeys at the Sierra release area. Turkeys may consume leaves and

reproductive parts of these plants. These are small perennial herbs (5-33 cm) that grow from a taproot or caudex. These plants are susceptible to disturbances by trampling by livestock.

Eriogonum spp. (buckwheat)

Two species of *Eriogonum* sp. on CNPS list 1B are potentially present in the project areas. *Eriogonum nervulosum* is relatively rare throughout its range, ranked G2 S2.2, with 54% of its distribution in Glenn and Lake counties. *Eriogonum umbellatum* var. *torreyanum* is more common out of state than in state (G5T2, S2.2), with 24% of its distribution in Sierra County.

Eriogonum sp. has been documented in more than one Merriam's turkey food habits study, comprising from 0.1 to 0.4% of the diet, and occurring in up to 38% of the sampled population (Korschgen 1967, Scott and Boeker 1973). In San Diego County (see Appendix D), *Eriogonum* sp. accounted for 5.34% and 5.15% of the diet in 1999 and 2000, respectively. Turkeys may consume vegetative and reproductive parts of these two species of *Eriogonum* sp. Wild turkeys are unlikely to come in contact with *E. nervulosum* because it occurs primarily in serpentine soils in chaparral habitats, which is peripheral habitat for wild turkeys.

Pedicularis centrantherna (dwarf lousewort)

Pedicularis centrantherna is on CNPS list 2. It is more common out of state than in state, with all of its distribution in Lassen County. *P. centrantherna* has been documented as a food item in Merriam's turkeys, accounting for 0.4% of the diet, occurring in one of seven birds sampled (Scott and Boeker 1973). It has not been reported in other literature and is probably not a preferred food item for turkeys.

P. centrantherna is found primarily in Great Basin scrub, which is peripheral habitat for turkeys.

Ranunculus macounii (Macoun's buttercup)

Ranunculus macounii is on CNPS list 2, and ranked of G5, S2.2, with occurrences in Shasta County, although it is not currently thought to exist there (CalFlora 2000). *Ranunculus* sp. has been documented as a food item in Merriam's turkeys outside of California, where it accounted for 4.3% (Scott and Boeker 1973) of the diet and occurred in one of seven sampled birds. It also has been documented in California, accounting for 0.3% of the diet, occurring in 29.3% of the sampled population (Smith and Browning 1967). In San Diego County (see Appendix D), plants in the Ranunculaceae family were consumed, accounting for 1.33% and 1.29% of the diet in 1999 and 2000, respectively. If encountered, *R. macounii* is a likely food item for turkeys.

Rumex venosus (winged dock)

Rumex venosus is on CNPS list 2, with a CNDDB ranking of G5?, S2.3, and all of its distribution in Lassen Counties. *Rumex* sp. has been documented as a Merriam's food item, accounting for < 0.01% of the diet (Laudenslager and Flake 1987). *Rumex venosus* occurs primarily in Great Basin habitats with sandy soils, which is peripheral habitat for wild turkeys.

Senecio ssp. (ragwort)

Three varieties of *Senecio* sp. are potentially present in the project areas. *Senecio eurycephalus* var. *lewisrosei* is on CNPS list 1B with a CNDDB ranking of G4T2Q, S2.2, and 30% of its range in Lake, Lassen, Mendocino, Plumas, and Shasta counties. *Senecio indecorus*, on CNPS list 2, is also common outside the state, but has a more limited range in state, with 100% of its distribution in Lassen and Shasta counties. *Senecio layneae* is a federal threatened species and state rare species. It has a limited range, with 89% occurring in El Dorado County. *Senecio* sp. was documented as a turkey food item in one study of Rio Grande turkeys, accounting for 0.3% of the diet (Korschgen 1967).

Because of its limited distribution *S. layneae* would be of most concern to impacts by turkeys. The primary threat to *S. layneae* is the rapid urbanization of western El Dorado County (California Department of Fish and Game 2001c). The Department has been working with other agencies and interested private individuals to establish a system of five preserves in gabbro soils occupied by this species and other listed species. These plants occur in oak woodlands and chaparral habitats, where turkeys may forage, although chaparral habitats are peripheral for wild turkeys.

Silene spp. (campion)

Two species of *Silene* spp., listed by the CNPS, are potentially present in the project areas. *Silene occidentalis* ssp. *longistipitata* is not common (G4T1, S1.2), but only 18% of its distribution is though to be in Plumas and Shasta counties. Historic occurrences have also been recorded in Lassen County, but none are thought to currently exist (CalFlora 2000). *Silene oregana* is ranked G5, S2.3, with 20% of its distribution in Sierra County. *Silene* sp. has been documented as a turkey food item. In a study of Merriam's turkeys, it accounted for < 0.1 to 0.6% of the diet and was found in

2 of 11 turkeys sampled (Scott and Boeker 1973). In San Luis Obispo County, it was found in trace amounts, in 1.7 and 3.4% of the turkeys sampled (Smith and Browning 1967).

The two species of *Silene* spp. potentially present in the project areas are found primarily in chaparral and sagebrush habitats, which are peripheral for turkeys, but may also be found on the edge of forested areas. If encountered, turkeys may consume parts of these species. *Silene occidentalis* ssp. *longistipitata* is more rare, but a small portion of its distribution may be in the project area. *Silene oregana* has a higher percentage potentially in the project area, but it is more common. Wild turkeys may consume vegetative and reproductive of this species if encountered.

Smilax jamesii (English Peak greenbrier)

Smilax jamesii is a relatively rare plant with a ranking of G2, S2.3, and 15% of its known distribution in Shasta County. Turkeys have been known to consume other species of *Smilax* sp. in the eastern and Florida subspecies (Korschgen 1967). Wild turkeys may consume vegetative and reproductive of this species if encountered.

Solidago gigantea (smooth goldenrod)

Solidago gigantea is common in other parts of its range, but rare in California, with a ranking of G5, S1.2?, and 43% of its Plumas counties. *Solidago californica* was consumed by turkeys in San Diego County (see Appendix D), accounting for 0.38% and 0.34% of the diet in 1999 and 2000, respectively. Turkeys may consume vegetative and reproductive parts of this species if encountered in the study areas.

Viola aurea (golden violet)

Viola aurea is on CNPS list 2, ranked G3G4, S2S3, and may be present in the area of the proposed Sierra release site. *Viola* sp. was documented as a turkey food item in both the California studies. In the San Luis Obispo study, it was documented in one of 58 birds in trace amounts (Smith and Browning 1967). In San Diego County (see Appendix D), it was consumed in both 1999 and 2000, accounting for between 0.02 and 0.37% of the diet. If encountered, turkeys may consume *V. aurea*, including vegetative and reproductive parts of this species.

Brodiae coronaria ssp. *rosea* (Indian Valley brodiaea)

Brodeiae coronaria ssp. *rosea* is a state endangered species. This member of the lily family is restricted to Lake, Glenn, and Colusa Counties, occurring in serpentine clay and gravel in open areas (California Department of Fish and Game 2001c). Turkey food habits studies have not been conducted in areas that this species occupies. Based on its physiognomy, turkeys may consume vegetative and reproductive parts of this species. However, open areas far from trees are not likely to be frequented by turkeys.

Rorippa subumbellata (Tahoe yellow cress)

Rorippa subumbellata is a state endangered species. This member of the mustard family occurs in course sand and cobble on the margins of Lake Tahoe and in limited areas of Nevada (California Department of Fish and Game 2001c). Habitats occupied by this species are not considered suitable for wild turkeys because of excessive snowfall, therefore, they are not expected to come in contact with it.

Ivesia spp. (Ivesia)

Five varieties of *Ivesia* spp. are known to occur in the area of the Plumas, Sierra, and Lassen release sites. All of the known range of *Ivesia aperta* var. *aperta*, *Ivesia bayleyi* var. *bayleyi*, and *Ivesia webberi* is in Plumas and Sierra counties. Fifty-six percent of *Ivesia aperta* var. *canina* populations are found in Sierra County, and 68% of *Ivesia sericoleuca* are found in Lassen, Plumas, and Sierra counties, with additional populations in Nevada and Placer Counties. The Lassen, Plumas, and particularly the Sierra release sites are all important areas for the remaining populations of this rare genus in California. The Antelope Valley Wildlife Area was known to harbor some of the remaining populations of these plants when surveyed in the early 1990's (see Figures 5.1 and 5.2).

Turkeys have not been known to consume *Ivesia* sp. Based on its physiognomy, it is not likely to be a preferred food item, but turkeys may incidentally consume vegetative and reproductive parts of these species if encountered.

Perennial Herbs Arising from Bulbs

Calochortus ssp. (tulips)

Two varieties of *Calochortus* ssp. on CNPS list 1B are potentially present in the project areas. *Calochortus clavatus* var. *avius* is ranked G4T3, S3.2, with 92% of its distribution in El Dorado County. *Calochortus longebarbatus* var. *longebarbatus* is ranked G4T4, S3.2, with 4% of its distribution in Shasta County (CalFlora 2000).

Calochortus sp. has been documented in food habits studies of Merriam's turkeys and in the San Luis Obispo County study (Smith and Browning 1967). In the Merriam's turkey study, they consumed these plants in spring, summer, and fall,

accounting for 0.3%, 1.3%, and <0.1% of the diet, respectively, and occurring in 33%, 29%, and 6% of the turkeys sampled, respectively (Scott and Boeker 1973). In San Luis Obispo, turkeys consumed *Calochortus* sp.during spring, accounting for 0.3% of the diet, occurring in 3.4% of the turkeys sampled (Smith and Browning 1967).

Turkeys may consume vegetative and reproductive parts of *Calochortus* sp. when available. In San Luis Obispo County, they were reported to consume flowers. Turkeys are also known to consume tubors, but the relationship between turkeys and bulb consumption for this genus is unclear. When feeding for tubors, turkeys will scratch a few inches below the surface to dig up these plant parts, however effects of scratching behavior are not known to cause declines in any of these species in their native range. *C. clavatus* var. *avius* would be of greater concern because so much of its distribution is in or near the El Dorado project area. Because this species is not widely available, turkeys are not likely to utilize it as a significant part of their diet.

Fritillaria roderickii (Roderick's fritiallry)

Fritillaria roderickii is a California endangered species. Only five native occurrences of this species have been known to exist, of which at least 50% of them are in Mendocino County (California Department of Fish and Game 2001c). This species occurs in coastal bluff scrub and coastal prairie habitats, which are peripheral habitat for turkeys. Turkeys are not known to consume species in this genus.

Shrubs

Arctostaphylos ssp. (manzanita)

Four varieties of *Arctostaphylos* sp. on CNPS list 1B are potentially present in the project areas. *Arctostaphylos canescens* ssp. *sonomensis* is ranked G3T2, S2.1, with 34% of its known distribution in Humboldt, Lake, and Mendocino counties. *Arctostaphylos manzanita* spp. *elegans* is ranked G5T2, S2.3 with 85% of its known distribution in Glenn and Lake counties. *Arctostaphylos nissenana* is ranked G2, S2.2, with 93% of its known distribution in El Dorado County. *Artoctaphylos stanfordiana* ssp. *raicheri* is ranked G3T2?, S2?, with 90% of its known distribution in Lake and Mendocino counties.

Arctostaphylos sp. is a common food item for Merriam's turkeys, who consume the berries from this plant particularly in fall and winter when mast becomes an important food source (Korschgen 1967, Scott and Boeker 1973). Given the opportunity, turkeys are likely to consume the berries of these plants in the project area, along with other species of *Arctostaphylos* sp. that may be more abundant in the environment. Turkeys coexist with *Arctostaphylos* sp. in their native range, and they are not known to impact this genus. Scratching behavior may be more prevalent while foraging on the ground for mast, but it is generally only done on the surface to remove litter and expose food items.

Ceanothus confusus (Rincon Ridge ceanothus)

Ceanothus confusus is ranked G5T2Q, S2.2, with 22% of its known range in Lake and Mendocino counties. *Ceanothus* sp. is not a common turkey food, and was reported in the San Luis Obispo County study in 1 of 58 birds in trace amounts (Smith

and Browning 1967). *Ceanothus* sp. occurs in habitats occupied by turkeys. Turkeys may consume vegetative and reproductive parts of this species.

Vaccinium coccineum (Siskyou Mountains huckleberry)

Vaccinium coccineum is a common plant in other parts of its range, but less common in California, with a ranking of G5Q, S2.2, and 40% of its known range in Plumas and Sierra counties. *Vaccinium* sp. has been reported in the eastern food habits literature, accounting for 0.1% to 0.5% of the turkey diet (Korschgen 1967). Turkeys may consume fruits of this species if encountered in the project areas. Scratching behavior to find fruits under litter may be common.

Viburnum ellipticum (Oval-leaved viburnum)

Viburnum ellipticum is a common plant in other parts of its range, but less common in California, with a ranking of G5, S2.3, and 43% of its known range in El Dorado County. *Viburnum sp.* has been reported in the eastern food habits literature, accounting for 0.4% of the turkey diet (Korschgen 1967). Turkeys may consume the reproductive parts of this species if encountered.

Indirect Effects to Plants

Concerns about modification of habitat through turkeys foraging activities, particularly scratching behavior, were raised during scoping. Turkey often scratch at the ground while feeding in search of food items. This behavior is most prevalent while feeding on the ground layer for items such as acorns that may be slightly buried or hidden under debris. Scratching generally occurs on the surface, but may go as deep as a few inches when foraging on tubors. Scratching behavior is not as prevalent when feeding on herbaceous vegetation for seeds, leaves, and insects such as

grasshoppers. A particular concern raised during scoping was that this behavior may increase the likelihood of invasion by non-native plants. However, turkey foraging is unlikely to be the cause of invasion of non-native plants that are not already in the local environment. There is no information available to suggest that scratching by turkeys has caused any significant environmental effects throughout their current range, in both native and non-native habitats.

Another concern is that non-native invasive plants may be spread through actual consumption of reproductive material and later defecation. The turkey digestive system is very powerful and most items, including hard seeds, are generally well digested when excreted in the fecal material. Because the turkey diet generally reflects those acceptable items most available to them in the environment, a proportional amount of those items are expected to be consumed and later excreted. Therefore, turkeys are unlikely to cause the spread of invasive plants that are not already well available in the environment. Furthermore, turkeys are only one of a number of animals that may potentially spread such species, and they are unlikely to be the cause of invasion by non-native plants. Turkeys are relatively resident species and any movements of such species would be local and unlikely to occur beyond their typical, limited daily movement patterns and normal home range.

This conclusion is supported by a study of non-native Galliformes, including pheasants (*Phasianus colchicus*) and chukar (*Alectoris chukar*), that was conducted from 1985-1988 in response to similar concerns in Haleakala National Park, Hawaii (Cole et al. 1995). The results of this study indicated that these species consumed plant items in relative proportions to their availability in the environment, consisting primarily of fruits of native woody dicots (39% and 47% respectively), and leaves (29% and 24% respectively) and flower parts (12% and 17% respectively) of alien, herbaceous dicots. The authors also germinated fecal samples from these birds and concluded that, “the role of these alien birds in facilitating seed dispersal and

germination of native plants is beneficial in restoring degraded ecosystems." This information from Hawaii is the only attempt that has been made to address the role of alien game birds in native ecosystems, although it does not represent an identical set of environmental conditions as the proposed project. However, the synthesis of literature regarding wild turkey food habits and this investigation of species with a similar niche, supports the conclusions that turkeys are not likely to have a significant impact on the existing environment through foraging activities.

Summary of Effects to Plants

Turkeys may consume vegetative and reproductive parts of most herbaceous vegetation. The annual grasses and herbs would be presumably most susceptible to impacts by herbivory because they rely on seed production to maintain populations. Of the genera of sensitive annuals potentially present in the project areas, *Astragalus* sp. and *Trifolium* sp. are the most commonly reported food items for turkeys. Some of the smaller varieties of these plants would be most vulnerable to disturbance resulting from turkey herbivory and associated feeding behavior, most notably scratching.

Perennial and woody plants would be less vulnerable to disturbance by loss of vegetative and reproductive materials, because of their ability to regenerate vegetatively. Of the sensitive perennials potentially present in the project area, *Carex* sp. *Erigeron* sp., *Eriogonum* sp., *Ranunculus* sp., and *Silene* sp. are the most commonly reported food items for turkeys. Similar to the annuals, the smaller varieties of these plants would also be presumably most vulnerable to disturbance by turkey herbivory and feeding activities. Although not a commonly reported food item, *Lathyrus biflorus* is also a very small plant that may be similarly vulnerable.

Turkeys may scratch under the surface to consume those perennial plants arising from bulbs. This behavior would be presumably more invasive to these plants.

Of these sensitive plants arising from bulbs potentially present in the project areas, *Calochortus* sp. is the most preferred food item for turkeys.

Turkeys most often consume the mast (fruits and seeds) of shrubs and trees, which is not likely to be invasive to these plants. Of the sensitive shrubs potentially present in the project areas, *Arctostaphylos* sp. is the most commonly reported food item for turkeys.

Of the sensitive plants potentially present in the project areas, those plants mentioned in the previous paragraphs are the most preferred food items for turkeys, and therefore have the highest likelihood of being consumed. The remaining plants may be consumed incidentally if encountered, as identified earlier.

Turkeys tend to select plants that are most available to them in the environment that are acceptable food items. Because most of the plants potentially present in the project areas are not abundant in the environment, turkeys may not encounter many of them. Turkeys do not exhibit high selectivity for particular species of plants that are not abundant in the environment, rather they tend to select those that are acceptable within their daily movement patterns.

Reported densities of Merriam's turkeys are generally less than five birds per square mile and they are not expected to cause invasive disturbances to the landscape similar to that of large mammals, including livestock. Furthermore, turkeys are also not particularly efficient herbivores in removing all available food items from an area. Although turkeys may repeatedly visit an area to feed, they are not known to cause incremental adverse long-term effects.

Turkeys are not considered invasive species and they are not known to have caused adverse effects to any plants in California or elsewhere. Turkeys have co-

evolved and currently coexist with many species similar to those sensitive species potentially present in the project area. Although turkeys may interact with some of these sensitive plants, the available information does not support a conclusion that such interactions will affect the distribution and/or abundance of any of these species. Therefore, the proposed project is not expected to cause a significant impact to any of the sensitive flora potentially present in the project areas.

EFFECTS TO SENSITIVE ANIMALS

Methods

Table 3.2 contains 46 sensitive animals potentially present in the composite project areas. Potential impacts of the proposed project to animals may include predation, competition, and modification of habitat. As discussed in Chapter 2, animals represented in the wild turkey diet are primarily invertebrates, of which insects are most prevalent and widespread. Although rarely reported in the scientific literature, wild turkeys have also been known to occasionally consume amphibians and reptiles. Therefore, only invertebrates, amphibians, and reptiles are considered potential food items for turkeys. All other sensitive species are included in the analysis for potential competition or modification of habitats.

All available information regarding sensitive animals potentially present in the project areas was utilized in this analysis, including life history, habitat requirements, and current range when available. The number of historic occurrences of each anaimal in the CNDDB database are indicated in Table 3.2. Potential impacts to each of the sensitive animals that may be present in the project areas follows. Animals are listed in order of their appearance on Table 3.2, within groups (invertebrates, reptiles and amphibians...).

Effects to Invertebrates

Invertebrates are the most common animal foods consumed by wild turkeys. One species of snail (*Monadenia* sp.) Is known to be present within the project areas. Because snails (Gastropoda) are common food items for turkeys, these species are potential food items for turkeys. Three other invertebrates also may be present in the project areas, the Shasta crayfish (*Pacifastacus fortis*), the Lake Tahoe benthic stonefly (*Capnia lacustra*), and the Spiny rhyacophilan caddisfly (*Rhyacophila spinata*), but because these species are freshwater invertebrates, they are unlikely food items for wild turkeys. Specific potential impacts to each of these species are discussed below.

Button's Sierra Sideband Snail (*Monadenia mormonum buttoni*)

Button's Sierra sideband snail is a federal species of concern and has no sensitive state status. This species may be found in the area of the proposed El Dorado release site, although its current distribution is not well known. If encountered, turkeys may consume individuals of this species.

Lake Tahoe benthic stonefly (*Capnia lacustra*)

The Lake Tahoe benthic stonefly is a federal species of concern. This species is a freshwater invertebrate endemic to Lake Tahoe, associated with deepwater plant communities. Turkeys are not well adapted to feeding in water, but may consume adult stoneflies. Although this particular stonefly is within 25 miles of the El Dorado release site, it is endemic to the Lake Tahoe area, which is not considered suitable habitat for wild turkeys. Therefore, turkeys are unlikely to come in contact with it

Spiny rhyacophilan caddisfly (*Rhyacophila spinata*)

The Spiny rhyacophilan caddisfly is a federal species of concern potentially present within the proposed El Dorado release area. This species is a freshwater invertebrate. Turkeys are not well adapted to feed in water, but may consume adult caddisflies largely as incidental food items.

Shasta crayfish (*Pacifastacus fortis*)

The Shasta crayfish is a state threatened species and a federal species of concern potentially present within the proposed Shasta release area. Turkeys have been known to occasionally consume crayfish particularly where crayfish are abundant in the environment (Schorger 1966). Turkeys are not well adapted to feed in water and are unlikely to consume this species.

Effects to Amphibians and Reptiles

Frogs (*Rana* spp.)

Five species of *Rana* spp. are known to be present within the project areas, including the California red-legged frog, mountain yellow-legged frog, foothill yellow-legged frog, and Cascade frog. A brief discussion of each of their habitat relationships and range relative to the proposed release areas are initially presented, followed by a discussion of potential impacts resulting from the proposed project.

Frogs are generally not reported as food items in the modern literature, although Audubon (1840) reported occurrences of tadpoles in the turkey diet, with no particular species mentioned. Turkeys are not known to consume any of these species in

California and the species are not expected to be significant food items for wild turkeys. Each of these frogs have several similar characteristics that make them unlikely prey for wild turkeys as initially presented below.

California Red-Legged Frog (*Rana aurora draytonii*)

The California red-legged frog (CRLF) is federally listed as threatened. It is designated as a California Species of Special Concern by the DFG and a protected species in Fish and Game Code. The CRLF was once widespread in California west of the Sierra/Cascade crest from Point Reyes (Marin County) and Redding (Shasta County) south into northwestern Baja California, Mexico. This species is now considered rare in the central Sierras, extirpated from the southern Sierras and Central Valley, and declining in the Coast ranges (Stebbins 1985, Jennings and Hayes 1994). Critical habitat for the CRLF as designated by the USFWS is contained within the project areas of the proposed El Dorado and Plumas release sites.

The CRLF inhabits moist environments in lower elevations and foothills from sea level to as high as 8,000 feet. The CRLF frequents permanent cool waters of ponds, lakes, reservoirs, and stream sides offering dense shrubbery and emergent vegetation. Generally considered pond frogs, this species may disperse far from water following breeding (Stebbins 1985). Larvae generally require four to five months to attain metamorphosis (Jennings and Hayes 1994).

Turkeys are known to forage in habitats occupied by the California Red-Legged Frog (G. Fellers, personal communication). The CRLF is a highly aquatic species, and although turkeys may wade in shallow water, they are not well adapted to feed in aquatic environments. Therefore, tadpoles and adult frogs are unlikely to be consumed in water. CRLF's may be consumed as incidental food items when they are found out of water. Turkeys exhibit predatory behavior in which they may attempt to consume

animals that move, however such behavior is most prevalent in poults. Recently metamorphosed frogs found around the edge of ponds would be potentially more vulnerable to turkey predation, although they would be difficult for turkeys to catch as they are generally found very close to open water and utilize it for escape cover. Similarly, CRLF's that emerge during winter rains to breed are also potentially more vulnerable to turkey predation, but they are unlikely to be consumed by turkeys because of their nocturnal behavior, whereas wild turkeys are diurnal, feeding exclusively during daylight, and roosting in trees at night. Adult CRLF's are unlikely to be consumed by turkeys because of their relatively large size (four to five inches in length). Turkeys may occasionally consume CRLF's as incidental food items.

Foothill Yellow-Legged Frog (*Rana boylii*)

The foothill yellow-legged frog (FYLF) is a federal Species of Concern. It is also designated as a California Species of Special Concern by DFG and is considered a protected species. Historically, the range of the FYLF extended from west of the Cascade Mountains to the San Gabriel River system (Camp Rincon) in Los Angeles County, California; however, the population at Camp Rincon is believed to be extinct (Stebbins 1985). This species is known to coexist with the mountain yellow-legged frog (MYLF; *Rana muscosa*) and exists from sea level to 7,000 feet. The FYLF may be found in the project areas of the El Dorado and Mendocino release sites.

The foothill yellow-legged frog inhabits streams. Egg laying usually occurs from late March to early June following the period of high flow discharge resulting from winter runoff. Generally, shallow slow-moving flows with a cobbled substrate are required for oviposition, offering significant refuge for tadpoles, which require approximately 15 weeks to attain post-metamorphic status (Jennings and Hayes 1994).

Turkeys may forage in habitats occupied by the FYLF, but they are not likely to be utilized as significant food items by turkeys for the many of the same reasons as the CRLF and NRLF are unlikely to be consumed by turkeys. However, the FYLF is smaller in size (from 1.5 to 3 inches) than either the CRLF and NRLF and the FYLF may be active during daylight hours, making it potentially more vulnerable to turkey predation.

Mountain Yellow-Legged Frog (*Rana muscosa*)

The MYLF is proposed for federal listing as endangered. It is designated as a California Species of Special Concern by DFG and is considered a protected species. This species is endemic to California, occupying an elevation range with the Sierra Nevada from 4,000 to 11,000 feet. The northern population includes a cluster near the vicinity of Buttes Creek in Plumas County, extending to the upper reaches of the Butte Creek drainage in Kern County (Jennings and Hayes 1994). A few populations have also been recorded in the higher elevations of southern California. MYLF's may be found in the project areas of the proposed El Dorado and Plumas release sites.

Mountain yellow-legged frogs are diurnal and inhabit ponds, lakes, and streams at moderate to high elevations; they prefer sloping banks with rocks or vegetation near the water's edge (Stebbins 1985). This frog breeds from May through August and is primarily found adjacent to aquatic refuge, and tadpoles may overwinter.

Similar to the FYLF, MYLF's may be more likely prey items than CRLFs or MRLFs because MYLF are smaller (1.5 to 3.5 inches) than CRLFs or MRLFs and diurnal. Turkeys are unlikely to forage in areas occupied by the MYLF. Because the MYLF is dependent on open water to escape predation, it is unlikely to be pursued by turkeys.

Cascade Frog (*Rana cascadae*)

The Cascade frog is a federal Species of Concern. It is also designated as a California Species of Special Concern by DFG and is considered a protected species. This frog historically occupied a range extending from the Cascade Mountains in northern Washington to near Lassen Peak, California, with a disjunct population in Washington's Olympic Mountains (Stebbins 1985). However, numerous populations have now been documented from eastern Siskiyou County showing that the range is more extensive than typically reported (Jennings and Hayes 1994). The elevation range for this species in California extends from about 700 to 7,500 feet. Cascade frogs may be found in the area of the proposed Shasta release site.

A diurnal frog, often sluggish, this species reproduces in both ponds and ephemeral waters characterized by herbaceous growth in areas where the substrate remains moist. Cascade frogs occur more typically in waters uninhabited by predatory fish, and seem to have shifted away from waters subject to fish-planting efforts (Jennings and Hayes 1994). Breeding occurs from March to mid-August as pond and stream ice begins to melt.

Turkeys may forage in areas occupied by the Cascade frog. The Cascade frog is relatively small in size (2 to 3 inches) and diurnal, making it potentially vulnerable to turkey predation.

Tailed Frog (*Ascaphus truei*)

The tailed frog is a federal Species of Concern. It is also designated as a California Species of Special Concern by and is a protected species in Fish and Game Code. The range of the tailed frog extends west of the Cascade Mountains, from British Columbia to Mendocino County, California (Stebbins 1985). Disjunct

populations exist within California in the Shasta region (Jennings and Hayes 1994). Its ranges in elevation from sea level to about 6,000 feet. The tailed frog may be found in the project area of the proposed Shasta release site.

The tailed frog occupies permanent streams of cold, clear aquatic habitats associated with old-growth stands of primarily forested habitat (Jennings and Hayes 1994). Breeding takes place from May through October, with a greater proportion of individuals breeding in the fall. Deposition of unpigmented eggs under a stony substrate occurs in summer, with hatching taking place in August and September (Stebbins 1985). Because the tailed frog is primarily an aquatic species that occupies old growth habitats, it is an unlikely prey item for wild turkeys.

Mount Lyell Salamander (*Hydromantes platycephalus*)

The Mount Lyell salamander is a federal Species of Concern and state Species of Special Concern. The species inhabits the Sierra Nevada from El Dorado County south to Tulare County, from about 4,000 to 12,000 ft in elevation. The Mount Lyell salamander may be found in the Smith Lake area of the proposed El Dorado release site.

The Mount Lyell salamander is largely restricted to alpine or subalpine vegetation and is adapted well to climb over smooth, inclined surfaces of glacially polished rock, frequently encountered in their environment. This salamander occupies high elevation and is most frequently found beneath rocks (Jennings and Hayes 1994). Turkeys have been known to antidotally consume salamanders. However, the Mount Lyell salamander is unlikely prey for turkeys because it occupies alpine habitats that are not suitable for wild turkeys.

Northwestern Pond Turtle (*Clemmys marmorata marmorata*)

The northwestern pond turtle is a federal Species of Concern. It is also designated as a California Species of Special Concern by DFG and is considered a protected species. This pond turtle ranges from western Washington south to Baja California, generally west of the Cascade-Sierra crest (Stebbins 1985). The northwestern and southwestern pond turtles are distributed to the north and south of San Francisco Bay, respectively; however, the two subspecies may intergrade throughout the Delta and San Joaquin Valley (Stebbins 1985). This species ranges in elevation from near sea level to about 4,700 ft. The northwestern pond turtle may be found in the area of the El Dorado, Mendocino, Trinity, and Shasta release sites.

Northwestern pond turtles require some slow-water habitat (Holland 1991a), which may include a variety of aquatic habitats such as ponds, marshes, sloughs, irrigation ditches, and wetlands. High quality habitat is most associated with availability of adequate basking sites (Holland 1991b) from which turtles can readily escape to the water. They occupy such habitats ranging from sea level to about 6,000 feet (Jennings and Hayes 1994). Western pond turtles require upland oviposition sites in the vicinity of the aquatic site (Holland 1991b), generally within about 200 m of the aquatic site (Jennings and Hayes 1994). Western pond turtles may move significant distances (i.e. 2 km) if the local conditions change and may tolerate at least 7 days without water (Jennings and Hayes 1994). Turkeys have not been known to consume turtles and they are not well adapted to forage in aquatic environments.

Effects to Birds

The most likely potential impacts to birds by wild turkeys are through competition, possibly for food or habitat. Turkeys have never been known to consume any birds, and are not expected to utilize any of the following birds as food items.

Swainson's Hawk (*Buteo swainsoni*)

The Swainson's hawk is listed as a threatened species by the state and has no federal status, but it is considered a sensitive species by the USFS. It is an uncommon breeding resident of the Central Valley, Klammath Basin, and Northeastern Plateau and may be found in the area of the proposed Lassen and Sierra release sites.

Swainson's hawks nest in stands with few trees in juniper-sage flats, riparian areas, and oak savannah in the Central Valley. Its typical habitat is open desert, grassland, or cropland containing scattered, large trees. The Swainson's hawk decline in California is primarily associated with loss of nesting habitats. It primarily forages on small mammals, but may also opportunistically consume other suitable prey including invertebrates (Zeiner et al. 1990a). Wild turkeys and Swainson's hawks both utilize large arthropods when they are available, however Swainson's hawks typically nest in habitat unsuitable for wild turkeys, as turkeys require more forested landscapes.

Willow Flycatcher (*Empidonax traillii*)

The willow flycatcher is listed as an endangered species by the state, and it may be found in the area of the proposed Sierra, El Dorado, Lassen, Plumas, and Shasta release sites. The subspecies potentially present in these areas is primarily *E. t. brewsteri* and possibly *E. t. adastus*, which have no federal status, although the species is considered sensitive by the USFS. *E. t. extimus*, which occupies southern California, was recently listed as endangered by the federal government. The willow flycatcher is a rare to locally uncommon summer resident in wet or moist meadows and montane riparian habitats from 2,000 to 8,000 feet in elevation in the Sierra Nevada, west of the crest (Zeiner et al. 1990a). The major decline of willow flycatcher populations can be attributed to degradation of riparian habitat in California. Other factors include grazing,

nest parasitism by brown-headed cowbirds, and disturbance in wintering areas (USDA 1998).

Willow flycatchers are neotropical migrants, present in California only during the breeding season. Adults arrive in late spring, and adults and fledglings leave the breeding area in August. Willow flycatchers prefer to nest on the fringes of dense willows or alders near streams and large meadows (USDA 1998). Because they construct their nests about 3 to 62 feet above the ground, they are generally absent form otherwise suitable nesting areas where lower willow branches have been heavily browsed by livestock. Meadows as small as 0.6 acre and narrow riparian areas may be used for nesting. Willow flycatchers probably do not breed in densely forested riparian areas. Standing or running water must be available during the early stages of breeding and pair formation. Willow flycatchers forage for insects by hawking from perches or gleaning insects from vegetation (Zeiner *et al.* 1990a).

Wild turkeys may occupy habitats also occupied by willow flycatchers. Willows and alders are not preferred roosting trees for wild turkeys, and are therefore unlikely to compete with willow flycatchers for nesting sites. Turkeys and willow flycatchers both consume insects, but turkeys tend to consume insects from vegetation, such as grasshoppers, and are not efficient at catching flying insects. They also consume insects when they are most abundant in the environment, and they are unlikely to compete with insectivores when resources are scarce.

Greater Sandhill Crane (*Grus canadensis tabida*)

The greater sandhill crane is listed as threatened by DFG and is a fully protected species. It has no federal status. This species may be found in the areas of the proposed Sierra, Lassen, Plumas, and Shasta release sites.

The greater sandhill crane is a rare breeding resident of California, with a few hundred birds that breed on the plateaus of the northeastern counties of the state (Remsen 1979). Most of the breeding population migrates south to winter in emergent wetlands and flooded agricultural fields in the Central Valley (Zeiner *et al.* 1990a). On their wintering grounds, the greater sandhill crane associates closely with the lesser sandhill crane (*Grus canadensis canadensis*), which winters but does not nest in California, and has much higher population numbers (Remsen 1979). The population status of the greater sandhill crane was reported as unknown by the Department in 1999 (California Department of Fish and Game 2001c).

Wintering cranes were once common in the Central Valley and in southern California (Grinnell and Miller 1944), but have declined drastically throughout their range. Draining of wetland habitat has been a major threat (Erlich 1988), as has the conversion of irrigation to overhead sprinklers in the breeding grounds (Remsen 1979). In the breeding grounds, grazing pressure and human disturbance may be destructive forces (Zeiner *et al.* 1990a). Erlich (1988) reported that early winter rains increase breeding success, but late spring rains decrease it.

When foraging, the greater sandhill crane prefers treeless areas of wet meadows, shallow wetlands, freshwater margins, grasslands, and also uses cropland with grain or corn stubble as well as other wet or dry agricultural fields. Fresh water is a requirement for drinking and bathing. In California, sandhill cranes subsist largely on waste grain in the fields (Zeiner *et al.* 1990a), but they are also opportunistic feeders, preying on aquatic invertebrates, insects, worms, and even berries and fruits when available (Zeiner *et al*. 1990a, Erlich 1988). Mated pairs have a long term pair bond and nesting is in remote wetlands or grasslands. These cranes roost at night and fly to feeding areas in large flocks in the daytime.

Greater sandhill cranes and turkeys generally occupy mutually exclusive habitats, and turkeys are unlikely to compete with these cranes for roost sites. Because greater sandhill cranes forage in treeless areas, feeding conflicts with wild turkeys are not expected.

Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle is listed as endangered by the state and threatened by the federal government. It is also a fully protected species in California. Bald eagles have been recorded in the area of the proposed Lassen, Mendocino, Plumas, and Shasta release sites, but may be present at any of the proposed sites.

The bald eagle is increasing throughout much of its range, including California. The USFWS had recommended that it be removed from the list of threatened and endangered species because the goals for recovery of this species have been met. This species winters throughout the state and breeds primarily in the northern two-thirds of the state. Nests are normally found in the upper canopy of large conifers. They are opportunistic foragers that feed on fish, waterfowl, small animals, and carrion (DFG 2001).

Wild turkeys typically roost in lower portions of conifers under canopy and they are not expected to compete with bald eagles for nest sites. Although both species are opportunistic foragers, they do not feed on similar species, but turkeys may become occasional prey for eagles.

Bank Swallow (*Riparia riparia*)

The bank swallow a state threatened species, but it has no federal status. Bank swallows may be found in the area of the proposed Plumas and Shasta release sites.

Bank swallows breed in California and spend the winter in South America. They are locally common in areas of sandy, vertical bluffs or riverbanks where they nest in colonial burrows. Alteration of river bank habitat is the primary reason for their decline (DFG 2001). They are insectivores that may forage in a wide variety of habitats including forests, grasslands, and brush lands (Zeiner et al. 1990a). Wild turkeys do not pose a competitive threat for nesting habitat with the bank swallow, and because bank swallows primarily consume flying insects, they are also unlikely to compete with bank swallows for food.

Northern Spotted Owl (*Strix occidentalis caurina*)

The northern spotted owl is listed as a threatened species by the federal government and has no state status, but it is considered a sensitive species by the California Department of Forestry and Fire Protection. The northern spotted owl may be found in the area of the proposed Mendocino, and Shasta release sites.

The northern spotted owl subspecies occupies dense, old-growth, multi-layered mixed conifer, redwood, and Douglas-fir habitats from sea level to about 7,600 feet in elevation. It usually nests in the broken top of a tree or snag cavity, but may also roost in oak habitats in winter. This owl feeds primarily on small mammals (Zeiner et al. 1990a). Old-growth habitat is generally not suitable for wild turkeys, therefore the two species are unlikely to occupy similar habitats. Turkeys and spotted owls may both roost in oak trees on the fringe of suitable habitats.

Great Gray Owl (*Strix nebulosa*)

The great gray owl is a state endangered species. It has no federal status, but is considered sensitive by the USFS. The great gray owl may be found in the area of the proposed Plumas, Sierra and Mendocino release sites.

The great gray owl generally occupies upper montane coniferous forests between about 4,500 and 7,500 feet in elevation. It generally nests in the broken tops of old-growth red-fir, mixed conifer, or lodgepole pine habitats, always in the vicinity of wet meadows. This owl usually preys on meadow-dwelling rodents, especially pocket gophers and voles, but may occasionally consume birds up to grouse size (Zeiner et al. 1990a). The loss of mature forest habitat for nesting and degradation of mountain meadow habitat by livestock grazing are the major causes for decline of this species. The status for this species in 1999 was reported by the Department as unknown (DFG 2001).

Turkeys and great gray owls may occupy similar habitats, particularly mountain meadows, however because they don't eat similar foods, turkeys are unlikely to compete with the owls for food.

Great blue heron (*Ardea heriodias*)

The great blue heron (*Ardea herodias*) is a fairly common bird throughout California in lowland, shallow, freshwater marsh and estuarine habitats, and less common at higher elevations. It has been documented in the area of the Shasta release site. It is primarily piscivorus, but may also opportunistically consume invertebrates, amphibians, reptiles, and small birds and mammals (Zeiner et al. 1990a). The great blue heron roosts colonially near water and its rookeries are considered sensitive by the Department.

Wild turkeys do not occupy similar habitats as great blue herons or consume similar foods. The only possible competition may be for roost sites, but herons prefer secluded taller trees near water, and turkeys prefer more forested habitats.

Cooper's Hawk (*Accipiter cooperii*)

The Cooper's hawk is a California Species of Special Concern. It is a breeding resident throughout much of California, that may be found at any of the project areas, with recorded occurrences in the Plumas project area. It nests in deciduous and coniferous trees, generally 6-15 m above ground, and preys on small birds, mammals, reptiles, and amphibians (Zeiner et al. 1990a).

Turkeys occupy habitats also occupied by Cooper's hawks. They may roost in trees also suitable as nesting sites for Cooper's hawks, although turkeys are not known to compete with Cooper's hawks for such sites. Turkeys do not pose a competitive threat to Cooper's hawks for food.

Northern goshawk (*Accipiter gentilis*)

The Northern goshawk is a Federal and California Species of Special Concern that may be found in any of the project areas. It breeds in California and is a scarce to uncommon resident. It prefers middle and higher elevation mature, dense conifer forests, but may be found in winter along the coast, foothills, and northern deserts. It hunts in wooded areas, using snags and broken tree tops as perches. It feeds primarily on birds, up to grouse size, and small mammals. It nests near water in the densest part of the stand, but close to openings (Zeiner et al. 1990a).

Habitats occupied by the Northern goshawk during breeding season are peripheral at most for turkeys, which tend to occupy more mid-seral stage forests.

Turkeys do not roost in dense canopy and do not pose a threat to goshawks for nesting sites. Turkeys do not pose a competitive threat to goshawks for food.

Tricolored blackbird (*Agelaius tricolor*)

The tricolored blackbird is a state and federal species of special concern. It primarily occupies the Central Valley and Central and Southern Coasts, but it also has been documented in the area of the El Dorado and Plumas release sites. It is a California resident that occupies wetland habitats, preferring cattails or tules, but also occupying thickets of willow, blackberry, and wild rose. Juveniles feed mostly on insects, spiders, and other animal matter, with grains, rice, oats, and seeds as major food items in fall and winter (Zeiner et al. 1990a). Turkeys generally do not occupy wetland habitats occupied by tricolored blackbirds, and most such habitat in California is outside the project areas.

Golden eagle (*Aquila chrysaetos*)

The golden eagle is a California Species of Special Concern and a fully protected species. It may be found throughout the state. It nests on cliffs and in large trees in open areas. It consumes mammals, birds, reptiles, and some carrion (Zeiner et al. 1990a).

Turkeys are occasional prey items for golden eagles. Because golden eagles are predators of turkeys, the species are not likely to compete for roosting and nesting sites.

Long-eared owl (*Asio otus*)

The long-eared owl is a California Species of Special Concern. It is an uncommon resident or winter visitant that may be found at the Sierra release site. It uses old magpie, crow, hawk, or other suitable nests in a variety of trees with dense cover. It consumes mostly small rodents and other small prey including birds and other vertebrates (Zeiner et al. 1990a). Turkeys may occupy habitats occupied by long-eared owls. The two species do not consume similar food items and are unlikely to compete for food.

Black swift (*Cypseloides niger*)

The black swift is a California Species of Special Concern. It breeds locally in the Sierra Nevada and Cascades of northern California and may be found in the area of the Shasta release site. It nests primarily on cliffs and feeds exclusively on flying insects (Zeiner et al. 1990a). Turkeys may occupy habitats occupied by black swifts, but they will not compete with them for nesting or roosting sites. Although turkeys consume insects, they are not well adapted to consume flying insects.

Yellow warbler (*Dendroica petechia brewsteri*)

The yellow warbler is a California Species of Special Concern. It is an uncommon to common summer resident in northern California, that has been documented in the area of the Mendocino release site, but may be found at any of the other release sites in suitable habitat. It nests in deciduous saplings or shrubs and consumes mostly insects and spiders in the upper canopy of these plants (Zeiner et al 1990a).

Turkeys may occupy habitats occupied by the yellow warbler, but they are not expected to compete with the warbler for nesting sites, as turkeys prefer to roost in larger trees. Turkeys also consume insects, but they generally feed from the ground and herbaceous layer and they are not expected to compete with yellow warblers for food.

Prairie falcon (*Falco mexicanus*)

The prairie falcon is a California Species of Special Concern. It is an uncommon permanent resident or migrant that occupies primarily open grasslands and savannahs, and has been recorded in the area of most of the release sites. It usually nests and perches on the sheltered ledge of cliffs. It consumes mostly small mammals, reptiles, and amphibians. Most suitable prairie falcon habitat is peripheral for wild turkeys, who prefer more forested landscapes.

Yellow-breasted chat (*Icteria virens*)

The yellow-breasted chat is a California Species of Special Concern. It is an uncommon summer resident along the coast and in the Sierra Nevada foothills, that has been documented in the area of the Mendocino release site. It nests in dense shrubs along streams and consumes insects and spiders from foliage of shrubs and low trees (Zeiner et al. 1990a). Turkeys may occupy habitats occupied by the yellow-breasted chat, but they are not expected to compete with the chat for nesting sites, as turkeys prefer to roost in larger trees. Turkeys also consume insects, but they generally feed from the ground and herbaceous layer.

California gull (*Larus californicus*)

The California gull is a California Species of Special Concern. It is an omnivore that occupies a variety of habitats, including shorelines, pastures, and landfill dumps. It nests on islands in alkali or freshwater (Zeiner et al. 1990a). Turkeys are not expected to compete with California gulls for nest and roost sites or food.

Black-Crowned Night Heron (*Nycticorax nycticorax*)

The black-crowned night heron is a fairly common colonial bird of California lowlands and foothills. It is primarily piscivorus, but may also opportunistically consume invertebrates, amphibians, and reptiles (Zeiner et al. 1990a). Black-crowned night herons roost colonially in dense vegetation near water and its rookeries are considered sensitive by the Department.

Wild turkeys do not occupy similar habitats as black-crowned night herons or consume similar foods. The only possible competition may be for roost sites, but these herons prefer trees in or near water, and turkeys prefer more forested habitats.

Osprey (*Pandion haliaetus*)

The osprey is a California Species of Special Concern. It breeds in northern California from the Cascades south through the Sierra Nevada and may be found in the area of any of the proposed release sites. It uses large trees near open water, preferring snags and broken tops for nesting and perching. It feeds primarily on fish, but may also opportunistically take small birds, mammals, and reptiles (Zeiner et al. 1990a).

Turkeys may occupy habitats near ospreys, but much of osprey habitat is peripheral for turkeys, who prefer more forested landscapes. Turkeys do not consume similar foods as osprey. Therefore, there are no competitive concerns between osprey and turkeys.

Double-crested cormorant (*Phalacrocorax auritis*)

The double-crested cormorant is a California Species of Special Concern. It is a year-long resident along the entire coast and on inland lakes, including fresh, salt, and estuarine waters. It has been documented in the area of the Lassen site, but may be present at other sites with suitable habitat. It roosts along water on a variety of suitable perches, including rocks, trees, on cliffs, and islands. This bird is primarily piscivorus, diving into the water, but may also consume crustaceans and amphibians (Zeiner et al. 1990a). The only potential competition between turkeys and cormorants may involve roost sites, but cormorants tend to select trees that have dead branches, which are not preferred by turkeys.

Effects to Mammals

Wolverine (*Gulo gulo*)

The wolverine is listed as threatened in California, and is a Federal species of Concern. It is a scarce resident of the higher elevations of the North Coast and Sierra Nevada (Zeiner et al. 1990b). It has been documented historically at all of the release sites, but current populations are not well known. It feeds primarily on carrion and small mammals. Turkeys are not expected to compete with wolverines for habitat or food as habitats occupied by the wolverine are generally too high in elevation for turkeys.

Sierra Nevada red fox (*Vulpes vulpes necator*)

The Sierra Nevada red fox is listed as threatened in California, and is a Federal Species of Concern. It is rare in the Sierra Nevada, with reported occurrences at the Lassen and Plumas release sites. It uses dense vegetation and rocky areas for den sites and may occupy a variety of habitats. It is an opportunistic predator that hunts a variety of small mammals and birds, and may consume any animals that it can catch. It is also a nest predator of upland ground nesting birds and waterfowl (Zeiner et al. 1990b). Wild Turkeys and Sierra Nevada red fox do not consume the same types of food or occupy similar habitats, therefore the two species are unlikely to compete for food sources or habitat.

Sierra Nevada mountain beaver (*Aplodontia rufa californica*)

The Sierra Nevada mountain beaver is a federal and state species of special concern. It occupies riparian habitats from the northwest coast through the Sierra Nevada, and has been recorded in the area of the Sierra release site. They burrow in dense thickets and consume vegetative parts of plants (Zeiner et al. 1990b). Wild turkeys do not occupy the same habitat as Sierra Nevada mountain beavers, therefore the two species are unlikely to compete with each other for food or habitat.

Red tree vole *(Arborimus pomo*)

The red tree vole is a federal and state Species of Special Concern. It occupies old growth habitats of primarily Douglas fir along the North Coast. It builds nests of needles in trees from 2 to 45 m above ground, and consumes needles (Zeiner et al. 1990b). Turkeys do not generally occupy old growth habitats, in favor of more mid-seral stage forests, however there is a small chance that turkeys may roost in trees occupied by red tree voles.

Townsend's big-eared bat (*Plecotus townsendii*)

Townsend's big-eared bat (*Plecotus townsendii*) is a California Species of Special Concern. It may be found in all habitats throughout the state except alpine and subalpine habitat, but is now considered uncommon. It requires caves or manmade structures such as mines, tunnels, and buildings for roosting and hibernation. It is nocturnal and captures small moths and other soft-bodied insects primarily in flight (Zeiner et sl. 1990b). Turkeys are diurnal and will not compete with Townsend's big-eared bats for roosts or food, preferring to consume insects from herbaceous vegetation.

Pine marten (*Martes americana*)

The pine marten is listed as a sensitive species by the USFS, primarily because of the impacts of timber harvest. It is a common permanent resident of the Klammath, Cascade, and Sierra Nevada mountain ranges, and has been recorded at all of the release sites. It uses cavities of large trees and snags and crevices in rocky areas for dens, and preys primarily on small mammals (Zeiner et al. 1990b). Turkeys do not generally occupy trees occupied by the pine marten or consume similar foods, and are not expected to compete with them for habitat or food.

Pacific fisher (*Martes pennanti pacifica*)

The Pacific fisher is a federal and state Species of Special Concern. It is an uncommon permanent resident of the Klammath, Cascades, and Sierra Nevada mountain ranges and has been documented in the area of the Mendocino and Plumas release sites. It dens in a variety of habitats, including tree cavities, brush piles, and logs. It typically occupies mature forests (Zeiner et al. 1990b). Suitable fisher habitat is peripheral for wild turkeys, who prefer mid-seral forest conditions.

Effects to Fish

The proposed project is not expected to have any impacts to fish. Although turkeys may wade into shallow water, they are not adapted to feed in water and are not known to consume any fish. Indirect impacts to fish could occur if turkeys caused any adverse effects to upland habitats that in turn affected downstream environmental conditions. Turkeys are not known to cause such impacts and there is no further information available to address this issues that was not presented under the section regarding indirect impacts to plants. Turkeys occupy riparian habitats throughout their native range, and have never been documented or implicated in any effects to lakes, rivers, streams, wetlands, or water quality.

Effects to other Galliformes

In any introduction, a primary concern is competition with other closely related species. Other Galliformes potentially present in the project areas include sage grouse (*Centrocercus urophasianus*), blue grouse (*Dendragapus obscurus*), California quail (*Callipepla californica*), and mountain quail (*Oreortyx pictus*). Of these species, sage grouse is the only one that is considered sensitive, listed as a California Species of Concern by the Department and sensitive by the BLM.

Sage grouse may be found in the area of the Lassen, Plumas, and Shasta release sites. Sage grouse primarily occupy sagebrush (*Tridentada* sp.) habitats, which are not suitable for wild turkeys. However, wet meadows and perennial grasslands are important seasonal habitats for sage grouse, particularly during late-summer for brood rearing (Zeiner et al. 1990a). These habitats are also important habitats for turkeys. Both species feed on forbs and insects, particularly during brood rearing. Turkeys and sage grouse coexist in their native range and there are no documented occurrences of competition between the two species.

Blue grouse are may be found in the area of all of the proposed release sites. Blue grouse occupy primarily fir and other coniferous habitats, with forest openings and available water. They feed on conifer needles, particularly fir, and other leaves, buds, fruits, flowers, and seeds. Broods feed primarily on arthropods (Zeiner et al. 1990a). Much of the habitats occupied by blue grouse are peripheral for turkeys; however, both species rear their broods in areas of wet meadows. Blue grouse and turkeys coexist in their native range and there are no documented occurrences of competition between the two species.

California quail and mountain quail may be found in the area of all of the release sites. They occupy primarily shrub, scrub, and brush habitats, in open stands of conifer and deciduous forests (Zeiner et al. 1990a). These habitats are peripheral for turkeys. Quail and turkeys both rely on arthropods in late summer. Turkeys and quail coexist within their native range and there are no documented occurrences of competition between them.

Summary of Effects to Animals

Invertebrates are the most common animal foods consumed by wild turkeys. Reptiles and amphibians are the only other group of sensitive animals that have appeared as food items in the wild turkey literature; however, such reports are rare. There are no known competitive relationships between wild turkeys and any of these species. The proposed project may result in some incidental predation of these sensitive animals potentially present in the project area, but based on the analysis herein, the proposed project is not expected to significantly affect the overall abundance or distribution of any of these species.

POTENTIALLY SIGNIFICANT IMPACTS TO LAND USE / PLANNING

The environmental checklist indicated that if the project could: a) conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect, and/or b) conflict with any applicable habitat conservation plan or natural community conservation plan, then the project could have a potentially significant impact to land use and planning. During the initial study, the Department determined that the proposed project may have a significant impact to land use and planning, indirectly through potential impacts to biological resources being protected under any such plan. However, because no significant impacts were found to biological resources, the project will not have a significant impact to land use and planning.